

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors: Dranoff et al. Attorney Docket: 02486/109
(formerly 50059/005002)

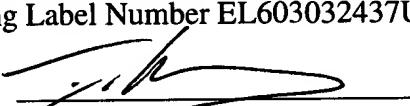
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Uses Thereof Date: August 29, 2002

CERTIFICATE OF MAILING

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Timothy M. Murphy

Honorable Commissioner of Patents
Washington, D.C. 20231

Statement of Sequence Listing

Sir:

In compliance with CFR §1.821(f), Applicants affirm that the Sequence Listing content of the paper copy and the computer readable copy are the same.

Date: August 29, 2002

Respectfully submitted,



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SEQUENCE LISTING

<110> Dranoff, Glenn
 Schmollinger, Jan
 Hodi, F. Stephen
 Mollick, Joseph

<120> TUMOR ANTIGENS AND USES THEREOF

<130> 2486/109 (formerly 50059/005002)

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 <151> 1998-08-07

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<212> DNA

<213> Homo sapiens

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 Trp Pro Leu Thr Ala Glu Val Pro Pro Glu Leu Leu Ala Ala Gly
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<210> 18
<211> 578
<212> PRT
<213> *Homo sapiens*

<400> 18
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 Arg His Asn Tyr Pro Asp Leu Val Glu Arg Asp Cys Asn Gly Asp Thr
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 Pro Asn Leu Ser Phe Tyr Arg Asn Glu Ile Arg Phe Leu Pro Asn Gly
 35 40 45
 Cys Phe Ile Glu Asp Ile Leu Gln Asn Trp Thr Asp Asn Tyr Asp Leu
 50 55 60
 Leu Glu Asp Asn His Ser Tyr Ile Gln Trp Leu Phe Pro Leu Arg Glu
 65 70 75 80
 Pro Gly Val Asn Trp His Ala Lys Pro Leu Thr Leu Arg Glu Val Glu
 85 90 95
 Val Phe Lys Ser Ser Gln Glu Ile Gln Glu Arg Leu Val Arg Ala Tyr
 100 105 110
 Glu Leu Met Leu Gly Phe Tyr Gly Ile Arg Leu Glu Asp Arg Gly Thr
 115 120 125
 Gly Thr Val Gly Arg Ala Gln Asn Tyr Gln Lys Arg Phe Gln Asn Leu
 130 135 140
 Asn Trp Arg Ser His Asn Asn Leu Arg Ile Thr Arg Ile Leu Lys Ser
 145 150 155 160
 Leu Gly Glu Leu Gly Leu Glu His Phe Gln Ala Pro Leu Val Arg Phe
 165 170 175
 Phe Leu Glu Glu Thr Leu Val Arg Arg Glu Leu Pro Gly Val Arg Gln
 180 185 190
 Ser Ala Leu Asp Tyr Phe Met Phe Ala Val Arg Cys Arg His Gln Arg
 195 200 205
 Arg Gln Leu Val His Phe Ala Trp Glu His Phe Arg Pro Arg Cys Lys
 210 215 220
 Phe Val Trp Gly Pro Gln Asp Lys Leu Arg Arg Phe Lys Pro Ser Ser
 225 230 235 240
 Leu Pro His Pro Leu Glu Gly Ser Arg Lys Val Glu Glu Gly Ser
 245 250 255
 Pro Gly Asp Pro Asp His Glu Ala Ser Thr Gln Gly Arg Thr Cys Gly
 260 265 270
 Pro Glu His Ser Lys Gly Gly Arg Val Asp Glu Gly Pro Gln Pro
 275 280 285
 Arg Ser Val Glu Pro Gln Asp Ala Gly Pro Leu Glu Arg Ser Gln Gly
 290 295 300
 Asp Glu Ala Gly Gly His Gly Glu Asp Arg Pro Glu Pro Leu Ser Pro

305	310	315	320
Lys Glu Ser Lys Lys Arg Lys Leu Glu Leu Ser Arg Arg Glu Gln Pro			
325	330	335	
Pro Thr Glu Pro Gly Pro Gln Ser Ala Ser Glu Val Glu Lys Ile Ala			
340	345	350	
Leu Asn Leu Glu Gly Cys Ala Leu Ser Gln Gly Ser Leu Arg Thr Gly			
355	360	365	
Thr Gln Glu Val Gly Gly Gln Asp Pro Gly Glu Ala Val Gln Pro Cys			
370	375	380	
Arg Gln Pro Leu Gly Ala Arg Val Ala Asp Lys Val Arg Lys Arg Arg			
385	390	395	400
Lys Val Asp Glu Gly Ala Gly Asp Ser Ala Ala Val Ala Ser Gly Gly			
405	410	415	
Ala Gln Thr Leu Ala Leu Ala Gly Ser Pro Ala Pro Ser Gly His Pro			
420	425	430	
Lys Ala Gly His Ser Glu Asn Gly Val Glu Glu Asp Thr Glu Gly Arg			
435	440	445	
Thr Gly Pro Lys Glu Gly Thr Pro Gly Ser Pro Ser Glu Thr Pro Gly			
450	455	460	
Pro Arg Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala Glu Ser Pro Ser			
465	470	475	480
Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg Asp Glu Pro Ala			
485	490	495	
Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly			
500	505	510	
Asp Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala			
515	520	525	
Gly Pro Ala Gly Asp Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly			
530	535	540	
Pro Ser Pro Ala Gly Pro Thr Arg Asp Glu Pro Ala Lys Ala Gly Glu			
545	550	555	560
Ala Ala Glu Leu Gln Asp Ala Glu Val Glu Ser Ser Ala Lys Ser Gly			
565	570	575	
Lys Pro			

<210> 19
 <211> 176
 <212> PRT
 <213> Homo sapiens

<400> 19			
Met Arg Val Leu Gly Thr Val Leu Arg Trp Pro Val Val Val Pro Arg			
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Pro Trp Pro Leu Pro Gly Pro Leu Pro His Arg Gly Thr Pro Arg Leu			
20	25	30	
Asp Thr Val Arg Thr Gly Leu Arg Arg Thr Gln Lys Val Glu Arg Gly			
35	40	45	
Pro Lys Lys Val Pro Leu Gly Ala His Arg Arg Pro Gln Ala Pro Ala			
50	55	60	
Gln Gln Asp Leu Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro			
65	70	75	80
Gln Ala Pro Ala Arg Gln Asp Leu Gln Gly Met Ser Gln Pro Arg Ala			
85	90	95	
His Arg Arg Pro Gln Ala Pro Ala Arg Gln Asp Leu Gln Gly Thr Ser			
100	105	110	
Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg Gln Asp Leu			
115	120	125	
Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala			
130	135	140	
Arg Gln Asp Leu Gln Gly Met Ser Gln Pro Arg Arg Gly Arg Gln Gln			
145	150	155	160
Ser Cys Arg Thr Gln Arg Trp Ser Leu Leu Pro Ser Leu Gly Ser Leu			
165	170	175	

<210> 20
<211> 49
<212> PRT
<213> Homo sapiens

<400> 20
Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp
1 5 10 15
Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly
20 25 30
Pro Ala Gly Asp Glu Pro Ala Lys Thr Pro Ser Glu Thr Pro Gly Pro
35 40 45
Ser

<210> 21
<211> 50
<212> PRT
<213> Homo sapiens

<400> 21
Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp Leu Gln Gly Thr
1 5 10 15
Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp
20 25 30
Leu Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro
35 40 45
Ala Gln
50

<210> 22
<211> 9
<212> PRT
<213> Homo sapiens

<400> 22
Ser Leu Gly Ser Pro Val Leu Gly Leu
1 5

<210> 23
<211> 10
<212> PRT
<213> Homo sapiens

<400> 23
Arg Leu Ala Ser Phe Tyr Asp Trp Pro Leu
1 5 10

<210> 24
<211> 20
<212> PRT
<213> Homo sapiens

<220>
<221> VARIANT
<222> (2)...(17)
<223> Xaa at 2 is Thr or Met; Xaa at 4 is Gln or Arg;
Xaa at 7 is Ala or Pro; Xaa at 16 is Arg or Gln.

<400> 24
Gly Xaa Ser Xaa Pro Arg Xaa His Arg Arg Pro Gln Ala Pro Ala Xaa
1 5 10 15
Gln Asp Leu Gln

20

<210> 25
<211> 14
<212> PRT
<213> Homo sapiens

<400> 25
Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp Leu Gln
1 5 10

<210> 26
<211> 20
<212> PRT
<213> Homo sapiens

<400> 26
Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg
1 5 10 15
Gln Asp Leu Gln
20

<210> 27
<211> 20
<212> PRT
<213> Homo sapiens

<400> 27
Gly Met Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg
1 5 10 15
Gln Asp Leu Gln
20

<210> 28
<211> 20
<212> PRT
<213> Homo sapiens

<400> 28
Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Gln
1 5 10 15
Gln Asp Leu Gln
20

<210> 29
<211> 20
<212> PRT
<213> Homo sapiens

<400> 29
Gly Thr Ser Gln Pro Arg Pro His Arg Arg Pro Gln Ala Pro Ala Arg
1 5 10 15
Gln Asp Leu Gln
20

<210> 30
<211> 20
<212> PRT
<213> Homo sapiens

<220>
<221> VARIANT
<222> (1)...(20)
<223> Xaa at 9 is Arg or Ser; Xaa at 14 is Ala or Thr;

xaa at 15 is Gly or Arg; xaa at 20 is Glu or Lys

<400> 30
Ser Pro Ser Glu Thr Pro Gly Pro Xaa Pro Ala Gly Pro Xaa Xaa Asp
1 5 10 15
Glu Pro Ala Xaa
20

<210> 31
<211> 20
<212> PRT
<213> Homo sapiens

<400> 31
Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp
1 5 10 15
Glu Pro Ala Glu
20

<210> 32
<211> 20
<212> PRT
<213> Homo sapiens

<400> 32
Ser Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg Asp
1 5 10 15
Glu Pro Ala Glu
20

<210> 33
<211> 20
<212> PRT
<213> Homo sapiens

<400> 33
Ser Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg Asp
1 5 10 15
Glu Pro Ala Lys
20

<210> 34
<211> 6670
<212> DNA
<213> Homo sapiens

<400> 34
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ccggcgcgag ggacgcggac gcaggggacg aggacgagga gtcggaggag ccgcgggggc 180
cgtgcccagc tcgttccagt ccagaatgac agggtccaga aactggcggag ccacgaggga 240
catgtgttagg tatcggcaca actatccgt acgtacctgc ccctgccccg ggacacagaa 300
ccctcccgcc agctgctctt ctcaggcaga atgtcccagg ttctactgga aggctggcct 360
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 <213> Homo sapiens

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 Cys Phe Ile Glu Asp Ile Leu Gln Asn Trp Thr Asp Asn Tyr Asp Leu
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 Leu Glu Asp Asn His Ser Tyr Ile Gln Trp Leu Phe Pro Leu Arg Glu
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 Phe Leu Glu Glu Ser Leu Val Arg Arg Glu Leu Pro Gly Val Arg Gln
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Ser Ala Leu Asp Tyr Phe Met Phe Ala Val Gly Cys Arg His Gln Arg
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 Arg Gln Leu Val His Phe Ala Trp Glu His Phe Arg Pro Arg Cys Lys
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 Phe Val Trp Gly Pro Gln Asp Lys Leu Arg Arg Phe Lys Pro Ser Ser
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 Ala Gln Thr Leu Ala Leu Ala Gly Ser Pro Ala Pro Ser Gly His Pro
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 Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala
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 Glu Ser Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg
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 <213> Homo sapiens

<400> 36

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 Pro Gly Ala Gly Ala Ser Gly Gly Thr Ser Pro Ser Ala Thr Gln Pro
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 Asn Pro Ala Val Phe Ile Phe Glu His Lys Ala Gln His Ile Ser Arg
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 Glu Asp Ala Phe Tyr Asn Ser Gln Lys Phe Glu Val Leu Tyr Cys Gly
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 Cys Met Glu Lys Phe Ser Leu His Glu Gln Gln Arg Leu Lys Ile Gln
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 Val Val Val Pro Gly Ser Pro Gly Asp Cys Leu Pro Glu Glu Ala Asp
 260 265 270
 Gly Thr Asp Thr His Leu Gly Leu Pro Ala Gly Ala Ser Gln Pro Ala
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 Gly Phe Asp Glu Gln Gln Glu Phe Arg Ser Arg Cys Ser Ser Val Thr
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 Gly Val Gln Arg Arg Val His Glu Gly Ser Gln Lys Ser Gln Pro Arg
 325 330 335
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 370 375 380
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Leu Lys Gln Ala Phe Ser Thr Ala Ala Ala Leu Gln Ser Ala Lys Thr			
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Gln Ile Lys Leu Cys Glu Ala Cys Pro Met His Ser Leu His Lys Leu			
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Cys Glu Arg Ile Glu Gly Leu Tyr Pro Pro Arg Ala Lys Leu Val Ile			
465	470	475	480
Gln Arg His Leu Ser Ser Leu Thr Asp Asn Glu Gln Ala Asp Ile Phe			
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Pro Glu Asn Ala Thr Ser Ser Gly Arg Phe Lys Leu Asp Ile Leu Lys			
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Asn Lys Ala Lys Arg Ser Leu Thr Ser Ser Leu Glu Asn Ile Phe Ser			
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His Thr Phe Ser His Pro Pro Ser Ser Thr Lys Arg Lys Leu Asn Leu			
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Gln Asp Gly Arg Ala Gln Gly Val Arg Ser Pro Leu Leu Arg Gln Ser			
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Ser Ser Glu Gln Cys Ser Asn Leu Ser Ser Val Arg Arg Met Tyr Lys			
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Cys Ser Asn Glu Ser Leu Ser Val Gly Gly Thr Ser Val Thr Pro Arg			
755	760	765	
Arg Ile Ser Trp Arg Gln Arg Ile Phe Leu Arg Val Ala Ser Pro Met			
770	775	780	
Asn Lys Ser Pro Ser Ala Met Gln Gln Gln Asp Gly Leu Asp Arg Asn			
785	790	795	800
Glu Leu Leu Pro Leu Ser Pro Leu Ser Pro Thr Met Glu Glu Glu Pro			
805	810	815	
Leu Val Ile Phe Leu Ser Gly Glu Asp Asp Pro Glu Lys Ile Glu Glu			
820	825	830	
Arg Lys Lys Ser Lys Glu Leu Arg Ser Leu Trp Arg Lys Ala Ile His			
835	840	845	
Gln Gln Ile Leu Leu Arg Met Glu Lys Glu Asn Gln Lys Leu Glu			
850	855	860	
Gly Ala Ser Arg Asp Glu Leu Gln Ser Arg Lys Val Lys Leu Asp Tyr			
865	870	875	880
Glu Glu Val Gly Ala Cys Gln Lys Glu Val Leu Ile Thr Trp Asp Lys			
885	890	895	
Lys Leu Leu Asn Cys Arg Ala Lys Ile Arg Cys Asp Met Glu Asp Ile			

900	905	910
His Thr Leu Leu Lys Glu Gly Val Pro Lys Ser Arg Arg	Gly Glu Ile	
915	920	925
Trp Gln Phe Leu Ala Leu Gln Tyr Arg Leu Arg His Arg Leu Pro Asn		
930	935	940
Lys Gln Gln Pro Pro Asp Ile Ser Tyr Lys Glu Leu Leu Lys Gln Leu		
945	950	955
Thr Ala Gln Gln His Ala Ile Leu Val Asp Leu Gly Arg Thr Phe Pro		
965	970	975
Thr His Pro Tyr Phe Ser Val Gln Leu Gly Pro Gly Gln Leu Ser Leu		
980	985	990
Phe Asn Leu Leu Lys Ala Tyr Ser Leu Leu Asp Lys Glu Val Gly Tyr		
995	1000	1005
Cys Gln Gly Ile Ser Phe Val Ala Gly Val Leu Leu His Met Ser		
1010	1015	1020
Glu Glu Gln Ala Phe Glu Met Leu Lys Phe Leu Met Tyr Asp Leu Gly		
1025	1030	1035
Phe Arg Lys Gln Tyr Arg Pro Asp Met Met Ser Leu Gln Ile Gln Met		
1045	1050	1055
Tyr Gln Leu Ser Arg Leu Leu His Asp Tyr His Arg Asp Leu Tyr Asn		
1060	1065	1070
His Leu Glu Glu Asn Glu Ile Ser Pro Ser Leu Tyr Ala Ala Pro Trp		
1075	1080	1085
Phe Leu Thr Leu Phe Ala Ser Gln Phe Ser Leu Gly Phe Val Ala Arg		
1090	1095	1100
Val Phe Asp Ile Ile Phe Leu Gln Gly Thr Glu Val Ile Phe Lys Val		
1105	1110	1115
Ala Leu Ser Leu Leu Ser Ser Gln Glu Thr Leu Ile Met Glu Cys Glu		
1125	1130	1135
Ser Phe Glu Asn Ile Val Glu Phe Leu Lys Asn Thr Leu Pro Asp Met		
1140	1145	1150
Asn Thr Ser Glu Met Glu Lys Ile Ile Thr Gln Val Phe Glu Met Asp		
1155	1160	1165
Ile Ser Lys Gln Leu His Ala Tyr Glu Val Glu Tyr His Val Leu Gln		
1170	1175	1180
Asp Glu Leu Gln Glu Ser Ser Tyr Ser Cys Glu Asp Ser Glu Thr Leu		
1185	1190	1195
Glu Lys Leu Glu Arg Ala Asn Ser Gln Leu Lys Arg Gln Asn Met Asp		
1205	1210	1215
Leu Leu Glu Lys Leu Gln Val Ala His Thr Lys Ile Gln Ala Leu Glu		
1220	1225	1230
Ser Asn Leu Glu Asn Leu Leu Thr Arg Glu Thr Lys Met Lys Ser Leu		
1235	1240	1245
Ile Arg Thr Leu Glu Gln Glu Lys Met Ala Tyr Gln Lys Thr Val Glu		
1250	1255	1260
Gln Leu Arg Lys Leu Leu Pro Ala Asp Ala Leu Ala Asn Cys Asp Leu		
1265	1270	1275
Leu Leu Arg Asp Leu Asn Cys Asn Pro Asn Asn Lys Ala Lys Ile Gly		
1285	1290	1295
Asn Lys Pro		

<210> 47
 <211> 2020
 <212> DNA
 <213> Homo sapiens

<400> 47		
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cggcccccgc cgctcgctct cggctcgccct tcacgcctcg cctgagcccg ccggggcccg		120
gccggccagc gcctgcctta tgagtgtgtc acgtggttgtt atccgattgg agctcgccga		180
acactcgctt gtcggccgc gcttcggctt cagcgcgcg gcccggggaaa tgtctgatga		240
ggagataaaa aagacgacac tagcctcagc ttagcctgtt tagaaggca agtcaccagg		300
agagaaagta gcgattatcc atcagcatct cggccgtcga gaaatgacag atgtgatcat		360

tgagaccatg	aagtccaaacc	cagatgaact	aaaaactaca	gtgaaagaaa	ggaagtcttc	420
agaagcctcc	cccactgcgc	aaagaagtaa	agatcacagt	aaggaatgca	taaacgctgc	480
cccagattct	ccgtccaaac	agcttccaga	ccagattca	ttcttcagt	gaaatccatc	540
agttgaaata	gttcatggta	ttatgcac	atataagaca	aataagatga	cctccttaaa	600
agaagatgtg	cggcgactg	ccatgctgtg	tatttcaca	gtccctgctg	caatgaccag	660
tcatgaccc	atgaagtgg	ttgccccatt	taacgacgt	attgaacaaa	tgaaaattat	720
cagagactct	actccaaacc	aatatatgg	gctgataaag	tttcgtgcac	aggctgatgc	780
ggatagttt	tatagatgac	gcaatggccg	ccagttcaac	tcaatagaag	atgacgttt	840
ccagctagt	tatgtggaaa	gagctgaagt	gctcaaattct	gaagatggcg	ccagcctccc	900
agtgtatggc	ctgactgaac	tccccaaagt	cacggtgtgt	ctggagcga	tggacgagtc	960
tgtgtatggc	atcctcacaa	cgttatgtaa	ccacagcttc	cacagccagt	gtctacagcg	1020
ctgggacgat	accacgtgtc	ctgtttgcgc	gtactgtcaa	acgcccggc	cagtagaaga	1080
aaataagtgt	tttgagtgtg	gtgttcagga	aaatctttgg	atttgtttaa	tatgcggcca	1140
cataggatgt	ggacggatgt	tcagtcgaca	tgcttataag	cactttgagg	aaacgcagca	1200
cacgtatgcc	atgcagctta	ccaaccatcg	agtctgggc	tatgctggag	ataactatgt	1260
tcatcgactg	gttgcagta	aaacagatgg	aaaaatagta	cagtagaat	gtgaggggga	1320
tacttgccag	gaagagaaaa	tagatgcctt	acagttagag	tattcatatt	tactaacaag	1380
ccagctggaa	tctcagcgaa	tctactggga	aaacaagata	gttcggatag	agaaggacac	1440
agcagaggaa	attaaacaaca	tgaagaccaa	gtttaagaaa	acaattgaga	agtgtataa	1500
tctagagcac	aaactaaatg	atccctaaa	agaaaagcag	tctgtggaaa	gaaagtgcac	1560
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caagtgttt	cgagccaaacc	aagtccctct	gcagaacaag	ctaaaagagg	aggagagggt	1680
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gcagaaatcc	aggagggaca	gatcaacatc	gccatggct	cggcctcgag	ccctgcctct	1860
tcggggggca	gtggaaagtt	gccctccagg	aaggccgca	gcaagagggg	caagtgacct	1920
tcagagcaac	agacatccct	gagactgttc	tccctgacac	tgtgagagt	tgtgggacc	1980
ttcagctaaa	tgtgagggtg	ggccctaata	agtacaagtg			2020

<210> 48
 <211> 600
 <212> PRT
 <213> Homo sapiens

<400> 48
 Met Ser Val Ser Leu Val Val Ile Arg Leu Glu Leu Ala Glu His Ser
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 Pro Val Pro Ala Gly Phe Gly Phe Ser Ala Ala Ala Gly Glu Met Ser
 20 25 30
 Asp Glu Glu Ile Lys Lys Thr Thr Leu Ala Ser Ala Val Ala Cys Leu
 35 40 45
 Glu Gly Lys Ser Pro Gly Glu Lys Val Ala Ile Ile His Gln His Leu
 50 55 60
 Gly Arg Arg Glu Met Thr Asp Val Ile Ile Glu Thr Met Lys Ser Asn
 65 70 75 80
 Pro Asp Glu Leu Lys Thr Thr Val Glu Glu Arg Lys Ser Ser Glu Ala
 85 90 95
 Ser Pro Thr Ala Gln Arg Ser Lys Asp His Ser Lys Glu Cys Ile Asn
 100 105 110
 Ala Ala Pro Asp Ser Pro Ser Lys Gln Leu Pro Asp Gln Ile Ser Phe
 115 120 125
 Phe Ser Gly Asn Pro Ser Val Glu Ile Val His Gly Ile Met His Leu
 130 135 140
 Tyr Lys Thr Asn Lys Met Thr Ser Leu Lys Glu Asp Val Arg Arg Ser
 145 150 155 160
 Ala Met Leu Cys Ile Leu Thr Val Pro Ala Ala Met Thr Ser His Asp
 165 170 175
 Leu Met Lys Phe Val Ala Pro Phe Asn Asp Val Ile Glu Gln Met Lys
 180 185 190
 Ile Ile Arg Asp Ser Thr Pro Asn Gln Tyr Met Val Leu Ile Lys Phe
 195 200 205
 Arg Ala Gln Ala Asp Ala Asp Ser Phe Tyr Met Thr Cys Asn Gly Arg
 210 215 220
 Gln Phe Asn Ser Ile Glu Asp Asp Val Cys Gln Leu Val Tyr Val Glu

225	Arg Ala Glu Val	230	Leu Lys Ser Glu Asp	235	Gly Ala Ser Leu Pro	240	Val Met
	245	250	250	255			
	Asp Leu Thr Glu	Leu Pro Lys Cys	Thr Val Cys Leu	Glu Arg	Met		Asp
	260	265	265	270			
	Glu Ser Val Asn Gly	Ile Leu Thr	Thr Leu Cys Asn	His Ser	Phe His		
	275	280	285				
	Ser Gln Cys Leu Gln	Arg Trp Asp Asp	Thr Thr Cys Pro	Val Cys Arg			
	290	295	300				
	Tyr Cys Gln Thr Pro	Glu Pro Val	Glu Asn Lys	Cys Phe Glu	Cys		
	305	310	315	320			
	Gly Val Gln Glu Asn	Leu Trp Ile Cys	Leu Ile Cys	Gly His Ile	Gly		
	325	330	335				
	Cys Gly Arg Tyr Val	Ser Arg His Ala	Tyr Lys His Phe	Glu Glu Thr			
	340	345	350				
	Gln His Thr Tyr Ala	Met Gln Leu Thr	Asn His Arg Val	Trp Asp Tyr			
	355	360	365				
	Ala Gly Asp Asn Tyr	Val His Arg	Leu Val Ala	Ser Lys Thr Asp	Gly		
	370	375	380				
	Lys Ile Val Gln Tyr	Glu Cys Glu	Gly Asp Thr	Cys Gln Glu	Glu Lys		
	385	390	395	400			
	Ile Asp Ala Leu Gln	Leu Glu Tyr	Ser Tyr Leu	Leu Thr Ser	Gln Leu		
	405	410	415				
	Glu Ser Gln Arg Ile	Tyr Trp Glu Asn	Lys Ile Val Arg	Ile Glu Lys			
	420	425	430				
	Asp Thr Ala Glu Glu	Ile Asn Asn	Met Lys Thr	Lys Phe	Lys Glu Thr		
	435	440	445				
	Ile Glu Lys Cys Asp	Asn Leu Glu	His Lys Leu	Asn Asp Leu	Leu Lys		
	450	455	460				
	Glu Lys Gln Ser Val	Glu Arg Lys	Cys Thr Gln	Leu Asn Thr	Lys Val		
	465	470	475	480			
	Ala Lys Leu Thr Asn	Glu Leu Lys	Glu Gln	Glu Met Asn	Lys Cys		
	485	490	495				
	Leu Arg Ala Asn Gln	Val Leu Leu	Gln Asn Lys	Leu Lys Glu	Glu Glu Glu		
	500	505	510				
	Arg Val Leu Lys Glu	Thr Cys Asp	Gln Lys Asp	Leu Gln Ile	Thr Glu		
	515	520	525				
	Ile Gln Glu Gln	Leu Arg Asp	Val Met Phe	Tyr Leu Glu	Thr Gln Gln		
	530	535	540				
	Lys Ile Asn His Leu	Pro Ala Glu	Thr Arg Gln	Lys Ser Arg	Arg Asp		
	545	550	555	560			
	Arg Ser Thr Ser	Pro Trp Pro	Arg Pro Ala	Leu Pro Leu	Arg Gly		
	565	570	575				
	Ala Val Gly Ser Cys	Pro Pro Gly	Arg Ala Ala	Ala Arg Gly	Ala Ser		
	580	585	590				
	Asp Leu Gln Ser Asn	Arg His Pro					
	595	600					

<210> 49

<211> 226

<212> DNA

<213> Homo sapiens

<400> 49					60	
ctgggatact	ccccctccca	ggtgtctgg	ggcaggcctg	tgcctatccc	tgctgtcccc	120
agggtggg	ccgggggtca	ggagctccag	aaggggccagc	tgggcatatt	ctgagattgg	180
ccatcagccc	ccatttctgc	tgcaaacctg	gtcagagcca	gtntccntc	catgggacct	226
aaagacagt	ccaagtgcct	gcaccgtgga	ccacagccga	gccact		

<210> 50

<211> 441

<212> DNA

<213> Homo sapiens

<400> 50
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 atacactatt ttgtcagcc agtgtttta aaaaaaatct atgaaaagtg tacttccggt 120
 tttctgtat tacttatctg ggcttgatct gaccagtcaa atgacattgc cctatttgg 180
 cctctgaggt tctatctgc tttgcagatg tacatgtat cccagtgatc tgcaaaatta 240
 atgcctttc caagaaaaaa tctttcttc tctgtatcg ttaattctga cagtgttagt 300
 gattctgtct tcattatagg ctttatttc attatcttttctt tctttatagt attttttgtt 360
 ataaagaaaaa cagtcttct gtgtataacct acggatgagg gtattattta aactgccaac 420
 aatatccaag acatggtaaa t 441

<210> 51
 <211> 393
 <212> DNA
 <213> Homo sapiens

<400> 51
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 taatttaggtt attgaccatg tcttggatat tggtggcagt ttaaataata ccctcatccg 120
 taggtataaca cagaaagact gtttctta taacaaaaaa tactataaag aaagagataaa 180
 tggaaataaag gcctataatg aagacagaat cactaacact gtcagaatta actgatacag 240
 agaagaaaaag atttttctt gggaaaagca ttaatttgc agatcactgg gataactatgt 300
 acatctgca a gctaaatag aacctcagag gtccaaatag ggcaatgtca tttcactgg 360
 cagatcaagc ccagataagt aatcacagaa aac 393

<210> 52
 <211> 427
 <212> DNA
 <213> Homo sapiens

<400> 52
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 cttttgaatc tagaaaaacaa gagaatgcg aagtcaattt tccctcatttcc tatgtttcc 120
 tttactctaa gaattcagaa acaaaatgtt gggtaacttc ctgttatctt aaaaaaagaa 180
 tcattcccttc ggtatccctt taactatctg gaacttgcg tgcattttta taatttacca 240
 tggacatcaa ttgtttgacc tgcctctttt atttgcgca tgacttctca gagaacctgt 300
 tataacttca ctgtgtaaaa ccacgtgaa atgaaggata actgatcaca aagaattatg 360
 tcttttgcata tccaacaaat ttacaaatata taagagaaaa atgcaattttt taaaaaaagg 420
 atatccct 427

<210> 53
 <211> 417
 <212> DNA
 <213> Homo sapiens

<400> 53
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 ccagttataa gatactcggtt ttttttttc tcttcagttt cccactattt ttgcttattt 120
 ttcctttct tgccttatcg tcaccttgcg actggtaatc tgattcaagt taaacaatgt 180
 tccttttgcg tctagaaaaac aagagaaatg caaagtcattt attccctcat tctatgtttc 240
 catttactt aagaattcag aaacaaacat gtgggtaact tccctgttac tttaaaaaaag 300
 aatcatccct tcggatttcc cttaaacttgc tggaaacttgc actgtcattt tataatttac 360
 catgtgacat aattgtttga cctgcctctt ttatttgcg catgacttct cagagaa 417

<210> 54
 <211> 362
 <212> DNA
 <213> Homo sapiens

<400> 54
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 aactggtaat ctgattcaag ttaaacaatg ttccttttgc atctagaaaa caagagaaat 120
 gcaaagtcat tattccctca ttctatgtttt ccatttactc taagaattca gaaacaaaca 180
 tggggtaac ttccctgttat cttaaaaaaa gaatcatccc ttcggatttcc ctttaactat 240
 ctggaaacttgc tactgtcattt ttataattta ccatgtgaca taattgttttgc acctgcctct 300

tttatgtat gcatgacttc tcagagaacc tgttatcaac tcactgtgta aaaccacgat 360
 ga 362

<210> 55
 <211> 236
 <212> DNA
 <213> Homo sapiens

<400> 55 60
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 gaaatgcaaa gtcattattc cctcattcta tgcttccatt tactctaaga attcagaaac 236
 aaacatgtgg gtaacttcct gttatcttaa aaaaagaatc atcccttcgg tcgacg

<210> 56 120
 <211> 368 180
 <212> DNA 240
 <213> Homo sapiens 300

<400> 56 368
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 ccaagacat gtcataaacc taattataaa tactttagaa agagtgacca ggacatgtat 120
 agaaaatgtct gcttacctgt agactttaaa aacaaacaaa aaaaacaaac aaaatttttg 180
 gagcatttaa tcatttttt tctccttta tctccttgc aatcttattg ttccttgat 240
 aataatacac ataaaatgttt gggattcat tgctgctaga ttatatcagg tttttacata 300
 gtgtctacta tatgctgttg ataagcttt tcctaaaaat agttatccctc tttttagtg 360
 ttttcccc

<210> 57 153
 <211> 153 210
 <212> DNA 180
 <213> Homo sapiens 240

<400> 57 300
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 cttttgaatc tagaaaacaa gagaatgca aagtcattat tccctcattc tatgcttcca 120
 tttactctaa gaattcagaa acaaacatgt ggg 153

<210> 58 368
 <211> 324 60
 <212> DNA 120
 <213> Homo sapiens 180

<400> 58 324
 agaaaacagt ctttctgygt atacctacgg atsagggtat tatttaact gcamcaata 60
 tccaaacgcat ggtcaataac ctaadcataa mtactttaga aagagtgacc aggccatgt 120
 tagaaaatgtc tgcttactgt agactttaaa aacaaacaaa aaaaacaaaca aatthttg 180
 gcatattatc attthttttc tccttttattc tccttthtgc atcttattgt ctccctgat 240
 aataatacaca taaatsttk gggattcatt gctgbhagat tataatcagg gtttacatag 300
 tgtctactat atgctgttg taag 324

<210> 59 416
 <211> 416 60
 <212> DNA 120
 <213> Homo sapiens 180

<400> 59 416
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 ctagaaaaca agagaaatgc aaagtcatca tccctcatt ctatgttcc atttactcta 120
 agaatttcac aacaaacatg tgggttaactt cctgttatct taaaaaaaga atcatccctt 180
 cggattcccc ttaactatct ggaacttgc ctgttattt ataatttacc atgtgacata 240
 attgtttgac ctgccttta tatttgc atgacttctc agagaacctg ttatcaactc 300
 actgtgtaaa accacgatga aatgaaggat aactgatcac aaagaattat gtcttttgag 360
 atccaaacaaa ttacaaatt ataagagaaa aatgcaattt tttaaaaag gatatc 416

<210> 60
 <211> 2489
 <212> DNA
 <213> Homo sapiens

<400> 60
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 ggctttgacc cgggttgc cggccagcac gaccggaggat gttggctggac agctggagga 180
 tgaacggaga agccgactgc cccacagacc tggaaatggc cggcccccggaa ggcacaagacc 240
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 atgacagctc caagttcaaa accaccgaat cacacatggc ctggggaaaaa gtagcattta 360
 aagactttc tggagacatg tgcaagctca aatgggtggc gatttctaatt gaggtgagga 420
 agttccgtac attgacagaa ttgatccctcg atgctcagga acatgttaaa aatcccttaca 480
 aaggcaaaaaa actcaagaaaa caccacgact tcccaaaagaa gcccctgacc ctttatttcc 540
 gcttcttcat ggagaagcgg gccaagtatg cggaaactcca ccctcgatg agcaacctgg 600
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 atattcagga ctccagaga gggaaacagg agttcgagcg aaacctggcc cgattcaggg 720
 aggatcacc cggaccatac cagaatgcca agaaatcgga catcccgag aagcccaaaa 780
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 gcgactacct ggcccgcttc aagaatgacc gggtaaggc ctgaaagcc atgaaatgaa 1620
 ccttggaaataa catggaaaag aaggagaac tgatgtggat taagaaggca gccgaagacc 1680
 aaaaggcata tgagagagag ctgagtgaga tgcgggcacc tccagctgt acaaattctt 1740
 ccaagaatg gaaattccag ggagaaccca agaaggctcc catgaacggt taccagaagt 1800
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 tggagatcgg cagtcgtctgg cagcgcatac cccagagcca gaaggagcac tacaaaaagc 1920
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 ctccccagga ccgtcagca tataaagagt acatctccaa taaacgtaa agcatgacca 2040
 agctgcgagg cccaaacccc aaatcccgcc ggactactct gcagtccaa tcggagtccg 2100
 aggaggatga tgaagaggat gaggatgacg aggacgagga tgaagaagag gaagatgatg 2160
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 cctcagactc tgactccaaat tgaggctcag cccacccca gggcagccag ggagagccca 2400
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<210> 61
 <211> 727
 <212> PRT
 <213> Homo sapiens

<400> 61
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 Lys Gly Gln Asp Arg Trp Ser Gln Glu Asp Met Leu Thr Leu Leu Glu
 20 25 30
 Cys Met Lys Asn Asn Leu Pro Ser Asn Asp Ser Ser Lys Phe Lys Thr
 35 40 45
 Thr Glu Ser His Met Asp Trp Glu Lys Val Ala Phe Lys Asp Phe Ser
 50 55 60

Gly Asp Met Cys Lys Leu Lys Trp Val Glu Ile Ser Asn Glu Val Arg
 65 70 75 80
 Lys Phe Arg Thr Leu Thr Glu Leu Ile Leu Asp Ala Gln Glu His Val
 85 90 95
 Lys Asn Pro Tyr Lys Gly Lys Lys Leu Lys Lys His Pro Asp Phe Pro
 100 105 110
 Lys Lys Pro Leu Thr Pro Tyr Phe Arg Phe Phe Met Glu Lys Arg Ala
 115 120 125
 Lys Tyr Ala Lys Leu His Pro Glu Met Ser Asn Leu Asp Leu Thr Lys
 130 135 140
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 His Glu Lys Lys Val Tyr Leu Lys Val Arg Pro Asp Glu Ile Met Arg
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 Asp Tyr Ile Gln Lys His Pro Glu Leu Asn Ile Ser Glu Glu Gly Ile
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 Thr Lys Ser Thr Leu Thr Lys Ala Glu Arg Gln Leu Lys Asp Lys Phe
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 Asp Gly Arg Pro Thr Lys Pro Pro Asn Ser Tyr Ser Leu Tyr Cys
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 Gln Asn Thr Trp Leu Asn Thr Glu Leu Lys Thr Lys Thr Asp Glu Leu
 195 200 205
 Leu Ala Leu Gly Arg Glu Lys Gly Asn Glu Ile Leu Glu Leu Lys Cys
 210 215 220
 Asn Leu Glu Asn Lys Lys Glu Glu Val Ser Arg Leu Glu Glu Gln Met
 225 230 235 240
 Asn Gly Leu Lys Thr Ser Asn Glu His Leu Gln Lys His Val Glu Asp
 245 250 255
 Leu Leu Thr Lys Leu Lys Glu Ala Lys Glu Gln Gln Ala Ser Met Glu
 260 265 270
 Glu Lys Phe His Asn Glu Leu Asn Ala His Ile Lys Leu Ser Asn Leu
 275 280 285
 Tyr Lys Ser Ala Ala Asp Asp Ser Glu Ala Lys Ser Asn Glu Leu Thr
 290 295 300
 Arg Ala Val Glu Glu Leu His Lys Leu Leu Lys Glu Ala Gly Glu Ala
 305 310 315 320
 Asn Lys Ala Ile Gln Asp His Leu Leu Glu Val Glu Gln Ser Lys Asp
 325 330 335
 Gln Met Glu Lys Glu Met Leu Glu Lys Ile Gly Arg Leu Glu Lys Glu
 340 345 350
 Leu Glu Asn Ala Asn Asp Leu Leu Ser Ala Thr Lys Arg Lys Gly Ala
 355 360 365
 Ile Leu Ser Glu Glu Glu Leu Ala Ala Met Ser Pro Thr Ala Ala Ala
 370 375 380
 Val Ala Lys Ile Val Lys Pro Gly Met Lys Leu Thr Glu Leu Tyr Asn
 385 390 395 400
 Ala Tyr Val Glu Thr Gln Asp Gln Leu Leu Glu Lys Leu Glu Asn
 405 410 415
 Lys Arg Ile Asn Lys Tyr Leu Asp Glu Ile Val Lys Glu Val Glu Ala
 420 425 430
 Lys Ala Pro Ile Leu Lys Arg Gln Arg Glu Glu Tyr Glu Arg Ala Gln
 435 440 445
 Lys Ala Val Ala Ser Leu Ser Val Lys Leu Glu Gln Ala Met Lys Glu
 450 455 460
 Ile Gln Arg Leu Gln Glu Asp Thr Asp Lys Ala Asn Lys Gln Ser Ser
 465 470 475 480
 Val Leu Glu Arg Asp Asn Arg Arg Met Glu Ile Gln Val Lys Asp Leu
 485 490 495
 Ser Gln Gln Ile Arg Val Leu Leu Met Glu Leu Glu Ala Arg Gly
 500 505 510
 Asn His Val Ile Arg Asp Glu Glu Val Ser Ser Ala Asp Ile Ser Ser
 515 520 525
 Ser Ser Glu Val Ile Ser Gln His Leu Val Ser Tyr Arg Asn Ile Glu
 530 535 540
 Glu Leu Gln Gln Gln Asn Gln Arg Leu Leu Val Ala Leu Arg Glu Leu
 545 550 555 560
 Gly Glu Thr Arg Glu Arg Glu Glu Gln Glu Thr Thr Ser Ser Lys Ile
 565 570 575
 Thr Glu Leu Gln Leu Lys Leu Glu Ser Ala Leu Thr Glu Leu Glu Gln
 580 585 590
 Leu Arg Lys Ser Arg Gln His Gln Met Gln Leu Val Asp Ser Ile Val
 595 600 605
 Arg Gln Arg Asp Met Tyr Arg Ile Leu Leu Ser Gln Thr Thr Gly Val
 610 615 620
 Ala Ile Pro Leu His Ala Ser Ser Leu Asp Asp Val Ser Leu Ala Ser
 625 630 635 640
 Thr Pro Lys Arg Pro Ser Thr Ser Gln Thr Val Ser Thr Pro Ala Pro
 645 650 655

Val Pro Val Ile Glu Ser Thr Glu Ala Ile Glu Ala Ala Leu
 660 665 670
 Lys Gln Leu Gln Glu Ile Phe Glu Asn Tyr Lys Lys Glu Lys Ala Glu
 675 680 685
 Asn Glu Lys Ile Gln Asn Glu Gln Leu Glu Lys Leu Gln Glu Gln Val
 690 695 700
 Thr Asp Leu Arg Ser Gln Asn Thr Lys Ile Ser Thr Gln Leu Asp Phe
 705 710 715 720
 Ala Ser Lys Arg Tyr Glu Met Leu Gln Asp Asn Val Glu Gly Tyr Arg
 725 730 735
 Arg Glu Ile Thr Ser Leu His Glu Arg Asn Gln Lys Leu Thr Ala Thr
 740 745 750
 Thr Gln Lys Gln Glu Gln Ile Ile Asn Thr Met Thr Gln Asp Leu Arg
 755 760 765
 Gly Ala Asn Glu Lys Leu Ala Val Ala Glu Val Arg Ala Glu Asn Leu
 770 775 780
 Lys Lys Glu Lys Glu Met Leu Lys Leu Ser Glu Val Arg Leu Ser Gln
 785 790 795 800
 Gln Arg Glu Ser Leu Leu Ala Glu Gln Arg Gly Gln Asn Leu Leu
 805 810 815
 Thr Asn Leu Gln Thr Ile Gln Gly Ile Leu Glu Arg Ser Glu Thr Glu
 820 825 830
 Thr Lys Gln Arg Leu Ser Ser Gln Ile Glu Lys Leu Glu His Glu Ile
 835 840 845
 Ser His Leu Lys Lys Leu Glu Asn Glu Val Glu Gln Arg His Thr
 850 855 860
 Leu Thr Arg Asn Leu Asp Val Gln Leu Leu Asp Thr Lys Arg Gln Leu
 865 870 875 880
 Asp Thr Glu Thr Asn Leu His Leu Asn Thr Lys Glu Leu Leu Lys Asn
 885 890 895
 Ala Gln Lys Glu Ile Ala Thr Leu Lys Gln His Leu Ser Asn Met Glu
 900 905 910
 Val Gln Val Ala Ser Gln Ser Ser Gln Arg Thr Gly Lys Gly Gln Pro
 915 920 925
 Ser Asn Lys Glu Asp Val Asp Asp Leu Val Ser Gln Leu Arg Gln Thr
 930 935 940
 Glu Glu Gln Val Asn Asp Leu Lys Glu Arg Leu Lys Thr Ser Thr Ser
 945 950 955 960
 Asn Val Glu Gln Tyr Gln Ala Met Val Thr Ser Leu Glu Glu Ser Leu
 965 970 975
 Asn Lys Glu Lys Gln Val Thr Glu Glu Val Arg Lys Asn Ile Glu Val
 980 985 990
 Arg Leu Lys Glu Ser Ala Glu Phe Gln Thr Gln Leu Glu Lys Lys Leu
 995 1000 1005
 Met Glu Val Glu Lys Glu Lys Gln Glu Leu Gln Asp Asp Lys Arg Arg
 1010 1015 1020
 Ala Ile Glu Ser Met Glu Gln Gln Leu Ser Glu Leu Lys Lys Thr Leu
 1025 1030 1035 104
 Ser Ser Val Gln Asn Glu Val Gln Glu Ala Leu Gln Arg Ala Ser Thr
 1045 1050 1055
 Ala Leu Ser Asn Glu Gln Gln Ala Arg Arg Asp Cys Gln Glu Gln Ala
 1060 1065 1070
 Lys Ile Ala Val Glu Ala Gln Asn Lys Tyr Glu Arg Glu Leu Met Leu
 1075 1080 1085
 His Ala Ala Asp Val Glu Ala Leu Gln Ala Ala Lys Glu Gln Val Ser
 1090 1095 1100
 Lys Met Ala Ser Val Arg Gln His Leu Glu Glu Thr Thr Gln Lys Ala
 1105 1110 1115 112
 Glu Ser Gln Leu Leu Glu Cys Lys Ala Ser Trp Glu Glu Arg Glu Arg
 1125 1130 1135
 Met Leu Lys Asp Glu Val Ser Lys Cys Val Cys Arg Cys Glu Asp Leu
 1140 1145 1150
 Glu Lys Gln Asn Arg Leu Leu His Asp Gln Ile Glu Lys Leu Ser Asp
 1155 1160 1165

Lys Val Val Ala Ser Val Lys Glu Gly Val Gln Gly Pro Leu Asn Val
 1170 1175 1180
 Ser Leu Ser Glu Glu Gly Lys Ser Gln Glu Gln Ile Leu Glu Ile Leu
 1185 1190 1195 120
 Arg Phe Ile Arg Arg Glu Lys Glu Ile Ala Glu Thr Arg Phe Glu Val
 1205 1210 1215
 Ala Gln Val Glu Ser Leu Arg Tyr Arg Gln Arg Val Glu Leu Leu Glu
 1220 1225 1230
 Arg Glu Leu Gln Glu Leu Glu Asp Ser Leu Asn Ala Glu Arg Glu Lys
 1235 1240 1245
 Val Gln Val Thr Ala Lys Thr Met Ala Gln His Glu Glu Leu Met Lys
 1250 1255 1260
 Lys Thr Glu Thr Met Asn Val Val Met Glu Thr Asn Lys Met Leu Arg
 1265 1270 1275 128
 Glu Glu Lys Glu Arg Leu Glu Gln Asp Leu Gln Gln Met Gln Ala Lys
 1285 1290 1295
 Val Arg Lys Leu Glu Leu Asp Ile Leu Pro Leu Gln Glu Ala Asn Ala
 1300 1305 1310
 Glu Leu Ser Glu Lys Ser Gly Met Leu Gln Ala Glu Lys Lys Leu Leu
 1315 1320 1325
 Glu Glu Asp Val Lys Arg Trp Lys Ala Arg Asn Gln His Leu Val Ser
 1330 1335 1340
 Gln Gln Lys Asp Pro Asp Thr Glu Glu Tyr Arg Lys Leu Leu Ser Glu
 1345 1350 1355 136
 Lys Glu Val His Thr Lys Arg Ile Gln Gln Leu Thr Glu Glu Ile Gly
 1365 1370 1375
 Arg Leu Lys Ala Glu Ile Ala Arg Ser Asn Ala Ser Leu Thr Asn Asn
 1380 1385 1390
 Gln Asn Leu Ile Gln Ser Leu Lys Glu Asp Leu Asn Lys Val Arg Thr
 1395 1400 1405
 Glu Lys Glu Thr Ile Gln Lys Asp Leu Asp Ala Lys Ile Ile Asp Ile
 1410 1415 1420
 Gln Glu Lys Val Lys Thr Ile Thr Gln Val Lys Ile Gly Arg Arg
 1425 1430 1435 144
 Tyr Lys Thr Gln Tyr Glu Glu Leu Lys Ala Gln Gln Asp Lys Val Met
 1445 1450 1455
 Glu Thr Ser Ala Gln Ser Ser Gly Asp His Gln Glu Gln His Val Ser
 1460 1465 1470
 Val Gln Glu Met Gln Glu Leu Lys Glu Thr Leu Asn Gln Ala Glu Thr
 1475 1480 1485
 Lys Ser Lys Ser Leu Glu Ser Gln Val Glu Asn Leu Gln Lys Thr Leu
 1490 1495 1500
 Ser Glu Lys Glu Thr Glu Ala Arg Asn Leu Gln Glu Gln Thr Val Gln
 1505 1510 1515 152
 Leu Gln Ser Glu Leu Ser Arg Leu Arg Gln Asp Leu Gln Asp Arg Thr
 1525 1530 1535
 Thr Gln Glu Glu Leu Arg Gln Gln Ile Thr Glu Lys Glu Glu Lys
 1540 1545 1550
 Thr Arg Lys Ala Ile Val Ala Ala Lys Ser Lys Ile Ala His Leu Ala
 1555 1560 1565
 Gly Val Lys Asp Gln Leu Thr Lys Glu Asn Glu Glu Leu Lys Gln Arg
 1570 1575 1580
 Asn Gly Ala Leu Asp Gln Gln Lys Asp Glu Leu Asp Val Arg Ile Thr
 1585 1590 1595 160
 Ala Leu Lys Ser Gln Tyr Glu Gly Arg Ile Ser Arg Leu Glu Arg Glu
 1605 1610 1615
 Leu Arg Glu His Gln Glu Arg His Leu Glu Gln Arg Asp Glu Pro Gln
 1620 1625 1630
 Glu Pro Ser Asn Lys Val Pro Glu Gln Gln Arg Gln Ile Thr Leu Lys
 1635 1640 1645
 Thr Thr Pro Ala Ser Gly Glu Arg Gly Ile Ala Ser Thr Ser Asp Pro
 1650 1655 1660
 Pro Thr Ala Asn Ile Lys Pro Thr Pro Val Val Ser Thr Pro Ser Lys
 1665 1670 1675 168

Val Thr Ala Ala Ala Met Ala Gly Asn Lys Ser Thr Pro Arg Ala Ser
 1685 1690 1695
 Ile Arg Pro Met Val Thr Pro Ala Thr Val Thr Asn Pro Thr Thr Thr
 1700 1705 1710
 Pro Thr Ala Thr Val Met Pro Thr Thr Gln Val Glu Ser Gln Glu Ala
 1715 1720 1725
 Met Gln Ser Glu Gly Pro Val Glu His Val Pro Val Phe Gly Ser Thr
 1730 1735 1740
 Ser Gly Ser Val Arg Ser Thr Ser Pro Asn Val Gln Pro Ser Ile Ser
 1745 1750 1755 176
 Gln Pro Ile Leu Thr Val Gln Gln Thr Gln Ala Thr Ala Phe Val
 1765 1770 1775
 Gln Pro Thr Gln Gln Ser His Pro Gln Ile Glu Pro Ala Asn Gln Glu
 1780 1785 1790
 Leu Ser Ser Asn Ile Val Glu Val Val Gln Ser Ser Pro Val Glu Arg
 1795 1800 1805
 Pro Ser Thr Ser Thr Ala Val Phe Gly Thr Val Ser Ala Thr Pro Ser
 1810 1815 1820
 Ser Ser Leu Pro Lys Arg Thr Arg Glu Glu Glu Asp Ser Thr Ile
 1825 1830 1835 184
 Glu Ala Ser Asp Gln Val Ser Asp Asp Thr Val Glu Met Pro Leu Pro
 1845 1850 1855
 Lys Lys Leu Lys Ser Val Thr Pro Val Gly Thr Glu Glu Glu Val Met
 1860 1865 1870
 Ala Glu Glu Ser Thr Asp Gly Glu Val Glu Thr Gln Val Tyr Asn Gln
 1875 1880 1885
 Asp Ser Gln Asp Ser Ile Gly Glu Gly Val Thr Gln Gly Asp Tyr Thr
 1890 1895 1900
 Pro Met Glu Asp Ser Glu Glu Thr Ser Gln Ser Leu Gln Ile Asp Leu
 1905 1910 1915 192
 Gly Pro Leu Gln Ser Asp Gln Gln Thr Thr Ser Ser Gln Asp Gly
 1925 1930 1935
 Gln Gly Lys Gly Asp Asp Val Ile Val Ile Asp Ser Asp Asp Glu Glu
 1940 1945 1950
 Glu Asp Glu Glu Asp Asp Asp Asp Glu Asp Asp Thr Gly Met Gly
 1955 1960 1965
 Asp Glu Gly Glu Asp Ser Asn Glu Gly Thr Gly Ser Ala Asp Gly Asn
 1970 1975 1980
 Asp Gly Tyr Glu Ala Asp Asp Ala Glu Gly Asp Gly Thr Asp Pro
 1985 1990 1995 200
 Gly Thr Glu Thr Glu Glu Ser Met Gly Gly Glu Gly Asn His Arg
 2005 2010 2015
 Ala Ala Asp Ser Gln Asn Ser Gly Glu Gly Asn Thr Gly Ala Ala Glu
 2020 2025 2030
 Ser Ser Phe Ser Gln Glu Val Ser Arg Glu Gln Gln Pro Ser Ser Ala
 2035 2040 2045
 Ser Glu Arg Gln Ala Pro Arg Ala Pro Gln Ser Pro Arg Arg Pro Pro
 2050 2055 2060
 His Pro Leu Pro Pro Arg Leu Thr Ile His Ala Pro Pro Gln Glu Leu
 2065 2070 2075 208
 Gly Pro Pro Val Gln Arg Ile Gln Met Thr Arg Arg Gln Ser Val Gly
 2085 2090 2095
 Arg Gly Leu Gln Leu Thr Pro Gly Ile Gly Gly Met Gln Gln His Phe
 2100 2105 2110
 Phe Asp Asp Glu Asp Arg Thr Val Pro Ser Thr Pro Thr Leu Val Val
 2115 2120 2125
 Pro His Arg Thr Asp Gly Phe Ala Glu Ala Ile His Ser Pro Gln Val
 2130 2135 2140
 Ala Gly Val Pro Arg Phe Arg Phe Gly Pro Pro Glu Asp Met Pro Gln
 2145 2150 2155 216
 Thr Ser Ser Ser His Ser Asp Leu Gly Gln Leu Ala Ser Gln Gly Gly
 2165 2170 2175
 Leu Gly Met Tyr Glu Thr Pro Leu Phe Leu Ala His Glu Glu Glu Ser
 2180 2185 2190

Gly Gly Arg Ser Val Pro Thr Thr Pro Leu Gln Val Ala Ala Pro Val
2195 2200 2205
Thr Val Phe Thr Glu Ser Thr Thr Ser Asp Ala Ser Glu His Ala Ser
2210 2215 2220
Gln Ser Val Pro Met Val Thr Thr Ser Thr Gly Thr Leu Ser Thr Thr
2225 2230 2235 224
Asn Glu Thr Ala Thr Gly Asp Asp Gly Asp Glu Val Phe Val Glu Ala
2245 2250 2255
Glu Ser Glu Gly Ile Ser Ser Glu Ala Gly Leu Glu Ile Asp Ser Gln
2260 2265 2270
Gln Glu Glu Glu Pro Val Gln Ala Ser Asp Glu Ser Asp Leu Pro Ser
2275 2280 2285
Thr Ser Gln Asp Pro Pro Ser Ser Ser Val Asp Thr Ser Ser Ser
2290 2295 2300
Gln Pro Lys Pro Phe Arg Arg Val Arg Leu Gln Thr Thr Leu Arg Gln
2305 2310 2315 232
Gly Val Arg Gly Arg Gln Phe Asn Arg Gln Arg Gly Val Ser His Ala
2325 2330 2335
Met Gly Gly Arg Gly Gly Ile Asn Arg Gly Asn Ile Asn
2340 2345

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